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(54) **Torchon lace machine**

Spitzenklöppelmaschine

Machine à dentelle torchon

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GB-A- 178 390

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a torchon lace machine in which a rotor metal for moving a spindle runner (bobbin) is mechanically rotatable alternately in forward and reverse directions as desired.

2. Description of the Related Art

[0002] A conventional torchon lace machine like the one of GB 178,390 A has rotor metals arranged on a same circle to face at their bay portions each other, and a spindle runner is interposed between the facing bay portions. Adjacent rotor metals are gear linked mutually, resulting in that odd numbered rotor metals and even numbered rotor metal are rotated in the opposite directions. Therefore, if one rotor metal is rotated 180 degrees through the space between the bay portions of its adjacent two rotor metals, spindle runners on both sides of the rotating rotor metal will be moved by one step, switching their positions.

[0003] In order to move a spindle runner by several steps continuously, as shown in Fig. 7, a spindle runner at the position a is moved by one step to the position a' passing through the path indicated by the broken line (outbound) by rotating a first rotor metal A clockwise (in the direction of the arrow) 180 degrees. At the same time, the spindle runner S' originally at the position a' is moved to the position a in exchange with the spindle runner S.

[0004] Subsequently, a second rotor metal B is rotated anticlockwise 180 degrees, and the spindle runner S is thereby moved by one step from the position a' to the position b passing through the path indicated by the alternate long and short dash line (inbound). When a third rotor metal C is subsequently rotated clockwise through 180 degrees, the spindle runner S is further moved by one step from the position b to the position c passing through the path indicated by the broken line (outbound). Such process is repeated sequentially.

[0005] However, since in the conventional torchon lace machine adjacent rotor metals are rotated in the opposite directions, a spindle runner has to be moved passing alternately through the outbound and inbound paths, that is, moved one step by a rotor metal rotating clockwise and then moved by one step by another rotor metal rotating anticlockwise, which poses problems as follows.

(1) It takes much time and a long stroke to move a desired spindle runner to a several step ahead target position.

(2) A spindle runner and another spindle runner are moved, exchanging their positions. Therefore, if every spindle runner carries a bobbin, yarns from adjacent bobbins will be tangled at a lace forming part.

In order to avoid this from occurring, for forming embossed pattern on a knitted ground, for example, it is needed to empty a number of spindle runners (no bobbins thereon) corresponding to the number of yarns required to form the embossed pattern.

SUMMARY OF THE INVENTION

[0006] In view of solving the problems mentioned above, an object of the present invention is to provide a torchon lace machine of a simple structure capable of moving a desired spindle runner rapidly by a short stroke to a target position several steps ahead without tangles of yarns even with every spindle runner carrying a bobbin thereon, as well as capable of forming an embossed pattern on a knitted ground or creating braid over braid as desired.

[0007] To achieve this object, a torchon lace machine according to the present invention is structured according to claim 1 to rotate each of the rotor metals forwardly and reversely as desired. The torchon lace machine includes: a vertical shaft supported by a fixed shaft so as to be rotatable integrally with a rotor metal; a drive shaft supported so as to be slidable in an orthogonal direction relative to the vertical shaft and capable of driving the vertical shaft to rotate forwardly or reversely from a neutral position according a sliding position of the drive shaft; slide biasing means for sliding the drive shaft; and stopper means for forcibly stopping the rotor metal when the slide biasing means holds the drive shaft in a neutral position relative to the vertical shaft.

[0008] With the torchon lace machine of the present invention, adjacent rotor metals can be rotated successively in the same direction such as clockwise or anticlockwise, therefore a certain spindle runner can be moved through either an outbound or inbound line. As a result, the present invention provides beneficial effects that even with every spindle runner carrying a bobbin thereon, it is possible to move a desired spindle runner to a target position several steps ahead rapidly by a short stroke without tangles of yarns, as well as to create complicated lace patterns such as embossed patterns or braid over braid with easiness.

[0009] In the torchon lace machine according to the invention, the vertical shaft may be integrated with a bevel gear, and the drive shaft may be integrated with two intermittent bevel gears having no tooth in a 180 degree range, facing to each other to sandwich the bevel gear of the vertical shaft. With this configuration, it is able to rotate the rotor metals forwardly and reversely with easiness and accuracy, by moving the two intermittent bevel gears on the drive shaft away from the bevel gear on the vertical shaft or engaging the two intermittent bevel gears alternately with the bevel gear on the vertical shaft depending on the sliding position of the drive shaft.

[0010] Further, the slide biasing means of the torchon lace machine according to the present invention may include: a solid cam fixed to one end of the drive shaft; a

fixed cam follower acting on a narrowed portion of a grooved cam to slide the drive shaft to its neutral point, the grooved cam provided at the center of a width of the solid cam in a rotation direction; two projecting cam followers acting on right and left edges of the solid cam to slide the drive shaft to either forward or reverse driving position; and solenoids for causing the two projecting cam followers to project into their operation range against the force of return springs when energized. Thereby, the torchon lace machine according to the present invention may be structured to control the sliding position of the drive shaft with accuracy by selecting the mechanical control by the cams or the electrical control by the solenoids.

[0011] With such a configuration, the present invention provides a beneficial effect that it is possible to control the sliding position of the drive shaft accurately by selecting the mechanical control by the cams or the electrical control by the solenoids.

[0012] Further, the torchon lace machine according to the present invention may be structured to rotate or stop rotating the rotor metals every 180 degrees always with a correct timing by provision of the stopper means including: a fork member biased downwards by a spring and engaged with a pawl of the rotor metal while not in operation; and an eccentric cam fixed to the drive shaft and pushing up the fork member against the spring at a timing when the drive shaft is slid to a position where the vertical shaft is driven to rotate forwardly or reversely.

[0013] According to such a configuration, the present invention provides a beneficial effect that the rotor metals can be rotated and stopped rotating every 180 degrees always with a correct timing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The nature, principle, and utility of the invention will become more apparent from the following detailed description when read in conjunction with the accompanying drawings in which like parts are designated by identical reference numbers, in which:

Fig. 1 is a partial plan view showing the arrangement of rotor metals and spindle runners according to an embodiment of the present invention;

Fig. 2 is a side cross sectional view of a drive mechanism for a rotor metal according to an embodiment of the present invention;

Fig. 3 is a perspective view showing the configuration of slide biasing means according to an embodiment of the present invention;

Fig. 4 is a perspective view showing the configuration of stopper means according to an embodiment of the present invention;

Figs. 5(a) and 5(b) are side cross sectional views showing the operational state of a drive mechanism for a rotor metal according to an embodiment of the present invention, Fig. 5(a) showing that a drive shaft

is held in a neutral position with respect to a vertical shaft, and Fig. 5(b) showing that the drive shaft is held in a driving position with respect to the vertical shaft;

Fig. 6 is a partial sectional view showing another configuration of slide biasing means according to an embodiment of the present invention; and

Fig. 7 shows the action of rotor metals and the course of movement of spindle runners according an embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0015] An embodiment of the present invention will now be described with reference to Figs. 1 through 6. Fig. 1 is a partial plan view showing the arrangement of rotor metals and spindle runners according to an embodiment of the present invention. Fig. 2 is a side cross sectional view of a drive mechanism for a rotor metal according to an embodiment of the present invention. Fig. 3 is a perspective view showing the configuration of slide biasing means according to an embodiment of the present invention. Fig. 4 is a perspective view showing the configuration of stopper means according to an embodiment of the present invention. Figs. 5(a) and 5(b) are side cross sectional views showing the operational state of a drive mechanism for a rotor metal according to an embodiment of the present invention, Fig. 5(a) showing that a drive shaft is held in a neutral position with respect to a vertical shaft, and Fig. 5(b) showing that the drive shaft is held in a drive position with respect to the vertical shaft. Fig. 6 is a partial sectional view showing another configuration of slide biasing means according to an embodiment of the present invention.

[0016] As shown in Figs. 1 and 2, a rotor metal 1 includes a top flange having flat circular arc bay portions 2 and peninsula portions 3 disposed back to back. A number of rotor metals (64 or 96, for example) are arranged such that the bay portions 2 face to each other in a continuous circular arc groove defined between an inner annular guide plate 4 and an outer annular guide plate 4'. A boat-shaped spindle runner 5 having a bobbin mounting member 5' is disposed between the bay portions 2 of each pair of adjacent rotor metals 1.

[0017] The rotor metal 1 rotates 180 degrees in the space between the bay portions 2 of adjacent rotor metals 1 so as to move the spindle runners 5 residing in the spaces between the bay portions 2, switching their positions with each other. When each of the spindle runners 5 has a bobbin 6 mounted on a bobbin mounting member 5', as shown in Fig. 2, a lace forming portion (not shown) forms a lace stitch by entwining yarns 7 from the respective bobbins 6.

[0018] The shaft 1' of the rotor metal 1 is hollow as shown in Fig. 2, and is provided with pawls 8, at the lower part thereof, protruding in the same direction as the peninsula portions 3 of the top flange. As described later,

a fork member 30 is lowered by the action of a spring 29, and these pawls 8 are fitted in (engaged with) a recess in the lower face of the fork member 30, thereby ensuring that the rotor metal 1 stops rotating at a rotation angle of 180 degrees.

[0019] The rotor metal 1 is integrally connected to the upper end of a vertical shaft 11 that is fitted in a fixed shaft 10 erected on a base 9 and is rotatable in a horizontal direction. The integral connection herein may refer to the rotor metal 1 and the vertical shaft 11 formed as a single entity, or the rotor metal 1 and the vertical shaft 11 separately formed but connected by means of a connecting member. A drive shaft 12 for driving the vertical shaft 11 is rotatably inserted into a space between inner and outer walls 9' and 9'' of the base 9 in the horizontal direction. The drive shaft 12 is inserted through a through hole 13 formed at the proximal end of the fixed shaft 10 supporting the vertical shaft 11.

[0020] The drive shaft 12 has a drive gear 14 fixed at its end outside the inner wall 9' of the base 9 and receiving linked rotation from a drive source (not shown). The drive gear 14 may be engaged or may not be engaged with an adjacent drive gear. Meanwhile, the drive shaft 12 is connected to the inner wall 9' of the base 9 by means of a sliding connection part 15, so that it is able to slide to the inner wall 9' side from the outer wall 9'' side thereof. The sliding connection part 15 can have any construction so far as it is capable of transferring rotation of the drive shaft 12 transmitted from the drive gear 14 from the inner wall 9' side to the outer wall 9'' side, and the drive shaft 12 is slidable freely in the axial direction on the outer wall 9'' side. Note that hereinafter the term "drive shaft" refers to the sliding-side drive shaft (on the outer wall 9'' side).

[0021] A bevel gear 16 is provided integrally to the lower end of the vertical shaft 11. Two intermittent bevel gears 17, 17' having no tooth in a 180 degree range (having teeth in the other 180 degree range) are provided integrally to the drive shaft 12 so as to face to each other, sandwiching the bevel gear 16 on the vertical shaft 11. Depending on a sliding position of the drive shaft 12, these intermittent bevel gears 17, 17' are separated from the bevel gear 16 on the vertical shaft 11 (neutral state) or alternatively engaged with the bevel gear 16 on the vertical shaft 11 (driving state). In other words, the vertical shaft 11 and the rotor metal 1 can be driven alternatively forwardly or reversely in accordance with a sliding position of the drive shaft 12.

[0022] Slide biasing means 18 adjusts the sliding position of the drive shaft 12. The slide biasing means 18 includes, as shown in Fig. 3; a solid cam 19, a fixed cam follower 21, two projecting cam followers 22, 22', and solenoids 24, 24'. The solid cam 19 is fixed to the outer end of the drive shaft 12. The fixed cam follower 21 acts on a narrowed portion 20' of a grooved cam 20 formed at the center of the width of the solid cam 19 in the rotational direction, so as to hold the drive shaft 12 in the neutral position (where both of the intermittent bevel gears 17, 17' are separated from the bevel gear 16). The

two projecting cam followers 22, 22' act respectively on the left and right edges L and R in the width direction of the solid cam 19 so as to hold the drive shaft 12 in the forward or reverse driving position (where one of the intermittent bevel gears 17, 17' is engaged with the bevel gear 16). The solenoids 24, 24' cause the projecting cam followers 22, 22' to project against return springs 23, 23, respectively, when energized.

[0023] The fixed cam follower 21 is disposed on the top face of a projecting table 25 projecting outwards from the lower part of the outer wall 9'' of the base 9 and acts on the narrowed portion 20' of the grooved cam 20 of the solid cam 19 so that, as shown in Fig. 2, the solid cam 19 and the drive shaft 12 are able to slide to the neutral position. The two solenoids 24, 24' are arranged side by side on a platform 27 such that plungers P face downwards. The platform 27 is fixed to the upper part of the outer wall 9'' of the base 9 at its proximal end by means of fixing means 26. The projecting cam followers 22, 22' are supported rotatably at the ends of the respective plungers P. It should be noted that the two solenoids 24, 24' are energized selectively, and the plungers P are projected when energized, and returned to the original positions by the spring force of the return spring 23 when not energized.

[0024] As shown in Fig. 5(a), when the solid cam 19 has rotated until the left and right edges L and R of the flared part thereof face downward, one of the projecting cam followers 22, 22' projects to its operational position upon a corresponding one of the solenoids 24, 24' being energized. The activation of the solenoid 24 causes the projecting cam follower 22 to project as shown in Fig. 5 (b), and the projection acts on the left-side edge L of the flared part of the solid cam 19 to make the solid cam 19 slide to the right (in the direction of arrow S) together with the drive shaft 12. One of the intermittent bevel gears fixed to the drive shaft 12, namely the intermittent bevel gear 17 is thereby meshed with the bevel gear 16 on the vertical shaft 11. As a result, the vertical shaft 11 and the rotor metal 1 are driven to a certain rotational direction (the forward or reverse direction).

[0025] Energizing the other solenoid 24' when the drive shaft 12 is in neutral position as described above causes the projecting cam follower 22' to project to an operation range, and the projection acts on the right edge R of the flared portion of the solid cam 19 to make the solid cam 19 slide to the left (in the direction of dashed-line arrow S') together with the drive shaft 12. The other bevel gear 17' fixed to the drive shaft 12 is thereby meshed with the bevel gear 16 on the vertical shaft 11, and the vertical shaft 11 and the rotor metal 1 are driven in the opposite direction from their operational direction. In other words, it is possible to rotate the rotor metal 1 clockwise and anticlockwise alternately as desired, by selecting which of the two solenoids 24, 24' is to be energized when the fixed cam follower 21 places the drive shaft 12 in the neutral position.

[0026] The rotor metal 1 is forcibly stopped rotating by

the action of stopper means 28 at the time when the rotor metal 1 has rotated exactly 180 degrees and when the drive shaft 12 has slid to the neutral position and is held therein as described above. The stopper means 28 includes, as shown in Fig. 4, a fork member 30 having a recess in its lower face that is fitted over (engaged with) the pawls 8 of the rotor metal 1 when lowered by the spring force of the spring 29, and an eccentric cam 31 for elevating the fork member 30 against the force of the spring 29.

[0027] A roller 33 is slidably in contact with the top face of the eccentric cam 31, and it is rotatably supported at the lower end of a shaft 32 which passes perpendicularly and slidably through the outer annular guide plate 4' and holds (secures) the base 30' of the fork member 30. Therefore, the shaft 32 is pushed up against the spring 29 by the action of the enlarged diameter portion of the eccentric cam 31, thereby separating (disengaging) the lower face recess of the fork member 30 from the pawls 8 of rotor metals 1.

[0028] The eccentric cam 31 pushes up the roller 33 of the shaft 32 at a timing when the drive shaft 12 is in the position where the vertical shaft 11 is driven to rotate forwardly or reversely. In the state where the roller 33 of the shaft 32 is pushed up by the eccentric cam 31, one of the intermittent bevel gears 17, 17' fixed to the drive shaft 12 is inevitably meshed with the bevel gear 16 on the vertical shaft 11. In order to maintain this intermeshed state while the roller 33 is pushed up by the enlarged diameter portion of the eccentric cam 31, the enlarged diameter portion of the eccentric cam 31 is provided with convex ribs 34 in parallel with each other in the circumferential direction, to prevent the roller 33 from sliding transversely to accidentally disengage the bevel gears. Fig. 5(b) shows that the roller 33 abuts against convex rib 34 from its inner side to maintain the intermeshed state between the bevel gear 16 and the intermittent bevel gear 17.

[0029] According to the present embodiment, a spindle runner 5 is interposed between each pair of rotor metals 1 arranged on the same circle to face to each other at their bay portions, and it is moved by sequential rotations of the rotor metals 1 in either clockwise or anticlockwise direction, since the rotor metals 1 are capable of rotating 180 degrees both clockwise and anticlockwise as desired.

[0030] Therefore, the present embodiment, unlike the prior arts, makes it possible to move any desired spindle runner 5 quickly to a target position several steps ahead without causing the tangles of yarns. Also, the present embodiment makes it possible to form an embossed pattern on a knitted ground with every spindle runner 5 carrying a bobbin 6 thereon.

[0031] Further, as shown in Fig. 6, the solenoids 24, 24' constituting the slide biasing means 18 as described in the embodiment above can also be arranged side by side on the base 9 such that the plungers face upwards, rotatably supporting the projecting cam followers 22, 22'

with their top ends, so that the projecting cam followers 22, 22' act on the solid cam 19 fixed to the outer end of the drive shaft 12. This makes it possible to utilize the space below the base 9 for wiring to energizing the solenoids 24, 24'.

[0032] Still further, as shown in Fig. 6, the present embodiment can be configured to have the eccentric cam 31, which is included in the stopper means 28 for the rotor metal 1, on the drive shaft 12 outside the outer wall of the base 9 (in the vicinity of the solid cam 19) and to cover the peripheral mechanism including the eccentric cam 31 and the solid cam 19 with an open/close outer cover 35. This makes it possible to conduct timing adjustment or other operations easily by opening the outer cover 35.

[0033] The invention is not limited to the above embodiments and various modifications may be made without departing from the scope of the invention. Any improvement may be made in part or all of the components.

Claims

1. A torchon lace machine **characterised in that** it comprises in combination :

a vertical shaft (11) supported by a fixed shaft (10) so as to be rotatable integrally with a rotor metal (1) ;

a drive shaft (12) supported so as to be slidable in an orthogonal direction relative to the vertical shaft (11) and capable of driving the vertical shaft (11) to rotate forwardly or reversely from a neutral position according to a sliding position of the drive shaft (12);

slide biasing means (18) for sliding the drive shaft (12); and

stopper means (28) for forcibly stopping the rotor metal (1) when the slide biasing means (18) holds the drive shaft (12) in a neutral position relative to the vertical shaft (11).

2. The torchon lace machine according to claim 1, wherein:

the vertical shaft is integrated with a bevel gear; and

the drive shaft is integrated with two intermittent bevel gears having no tooth in a 180 degree range and facing to each other so as to sandwich the bevel gear of the vertical shaft.

3. The torchon lace machine according to claim 1 or 2, wherein the slide biasing means comprises:

a solid cam fixed to one end of the drive shaft; a fixed cam follower acting on a narrowed portion of a grooved cam to slide the drive shaft to

its neutral point, the grooved cam provided at the center of a width of the solid cam in a rotation direction;
two projecting cam followers acting on right and left edges of the solid cam to slide the drive shaft to either forward or reverse driving position; and solenoids energized for causing the two projecting cam followers to project into their operation ranges against force of return springs.

4. The torchon lace machine according to any one of claims 1 to 3, wherein the stopper means comprises:

a fork member biased downwards by a spring and engaged with a pawl of the rotor metal while not in operation; and
an eccentric cam fixed to the drive shaft and pushing up the fork member against the spring at a timing when the drive shaft is slid to a position where the vertical shaft is driven to rotate forwardly or reversely.

Patentansprüche

1. Torchonspitzenmaschine, **dadurch gekennzeichnet, dass** sie in Kombination umfasst:

eine vertikale Welle (11), die von einer stationären Welle (10) so getragen wird, dass sie integral mit einem Rotormetall (1) gedreht werden kann; eine Antriebswelle (12), die so getragen wird, dass sie in einer relativ zu der vertikalen Welle (11) senkrechten Richtung geschoben werden kann und die vertikale Welle (11) so antreiben kann, dass sie sich entsprechend einer Gleitposition der Antriebswelle (12) aus einer neutralen Position vorwärts oder rückwärts dreht; eine Schiebe-Spanneinrichtung (18), die die Antriebswelle (12) verschiebt; und eine Anschlageneinrichtung (28), die das Rotormetall (1) zwangsweise zum Halten bringt, wenn die Schiebe-Spanneinrichtung (18) die Antriebswelle (12) in einer neutralen Position relativ zu der vertikalen Welle (11) hält.

2. Torchonspitzenmaschine nach Anspruch 1, wobei:

die vertikale Welle integral mit einem Kegelrad verbunden ist; und
die Antriebswelle integral mit zwei Zwischen-Kegelrädern ohne Zähne in einem Bereich von 180° verbunden ist, die einander so zugewandt sind, dass sie das Kegelrad der vertikalen Welle einschließen.

3. Torchonspitzenmaschine nach Anspruch 1 oder 2, wobei die Schiebe-Spanneinrichtung umfasst:

einen massiven Nocken, der an einem Ende der Antriebswelle befestigt ist;
einen stationären Nockenstößel, der auf einen verschmälerten Abschnitt eines mit Nuten versehenen Nockens wirkt, um die Antriebswelle an ihren neutralen Punkt zu schieben, wobei der mit Nut versehene Nocken in einer Drehrichtung in der Mitte einer Breite des massiven Nockens vorhanden ist;
zwei vorstehende Nockenstößel, die auf einen rechten und einen linken Rand des massiven Nockens wirken, um die Antriebswelle entweder in Vorwärts- oder Rückwärts-Antriebsposition zu schieben; und
Elektromagneten, die erregt werden, um zu bewirken, dass die zwei vorstehenden Nockenstößel gegen die Kraft von Rückstellfedern in ihre Arbeitsbereiche hinein vorstehen.

4. Torchonspitzenmaschine nach einem der Ansprüche 1 - 3, wobei die Anschlageneinrichtung umfasst:

ein Gabelelement, das durch eine Feder nach unten gespannt wird und mit einer Klaue des Rotormetalls in Eingriff kommt, wenn es nicht in Funktion ist; und
einen exzentrischen Nocken, der an der Antriebswelle befestigt ist und das Gabelelement gegen die Feder zu einem Zeitpunkt nach oben drückt, zu dem die Antriebswelle an eine Position geschoben wird, an der die vertikale Welle so angetrieben wird, dass sie sich vorwärts oder rückwärts dreht.

Revendications

1. Machine à dentelle torchon **caractérisée en ce qu'elle comporte en combinaison:**

un arbre vertical (11) supporté par un arbre fixe (10) de manière à pouvoir tourner d'un seul tenant avec un rotor métallique (1),
un arbre d'entraînement (12) supporté de manière à pouvoir coulisser dans une direction orthogonale par rapport à l'arbre vertical (11) et capable d'entraîner l'arbre vertical (11) à tourner vers l'avant ou vers l'arrière à partir d'une position neutre en fonction d'une position de coulisserment de l'arbre d'entraînement (12),
des moyens de contrainte de coulisserment (18) pour faire coulisser l'arbre d'entraînement (12); et
des moyens d'arrêt (28) pour arrêter de manière forcée le rotor métallique (1) lorsque les moyens de contrainte de coulisserment (18) maintiennent l'arbre d'entraînement (12) dans une position neutre par rapport à l'arbre vertical (11).

2. Machine à dentelle torchon selon la revendication 1, dans laquelle:

l'arbre vertical est muni d'un seul tenant d'un engrenage conique, et 5
 l'arbre d'entraînement est muni d'un seul tenant de deux engrenages coniques intermittents n'ayant pas de dents dans une plage de 180° et en vis-à-vis l'un de l'autre de manière à enserrer l'engrenage conique de l'arbre vertical. 10

3. Machine à dentelle torchon selon la revendication 1 ou 2, dans laquelle les moyens de contrainte de coulisement comportent :

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 une came pleine fixée à une extrémité de l'arbre d'entraînement,
 un suiveur de came fixe agissant sur une partie rétrécie d'une came à gorge pour faire coulisser l'arbre d'entraînement vers son point neutre, la came à gorge étant agencée au centre d'une largeur de la came pleine dans une direction de rotation, 20
 deux suiveurs de came en saillie agissant sur les bords droit et gauche de la came pleine pour faire coulisser l'arbre d'entraînement vers une position d'entraînement vers l'avant ou l'arrière, et 25
 des solénoïdes mis sous tension pour amener les deux suiveurs de came en saillie à faire saillie dans leur plage de fonctionnement à l'encontre de la force d'un ressort de rappel. 30

4. Machine à dentelle torchon selon l'une quelconque des revendications 1 à 3, dans laquelle les moyens d'arrêt comportent : 35

un élément formant fourche rappelé vers le bas par un ressort et en prise avec un cliquet du rotor métallique lorsqu'il n'est pas en fonctionnement, 40
 et
 une came formant excentrique fixée sur l'arbre d'entraînement et poussant l'élément formant fourche à l'encontre du ressort au niveau d'une synchronisation avec le moment où l'arbre d'entraînement est coulissé vers une position où l'arbre vertical est entraîné à tourner vers l'avant ou vers l'arrière. 45

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FIG. 1

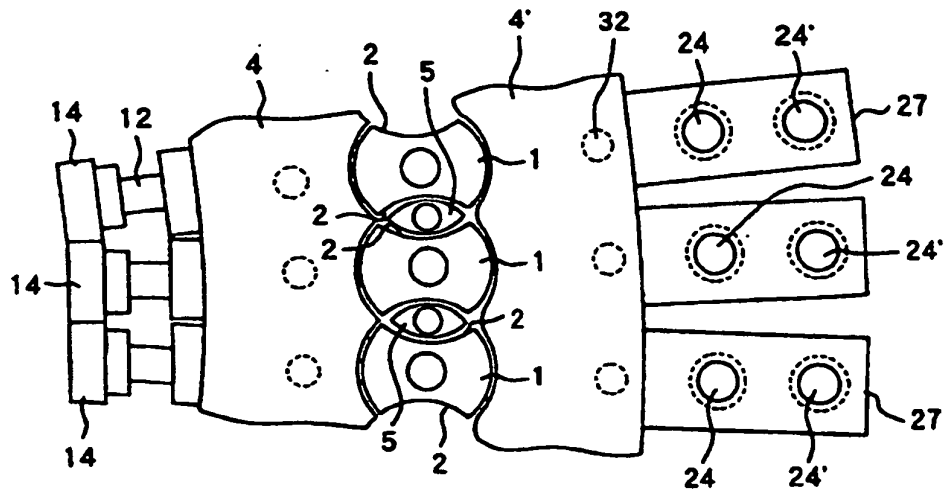


FIG. 2

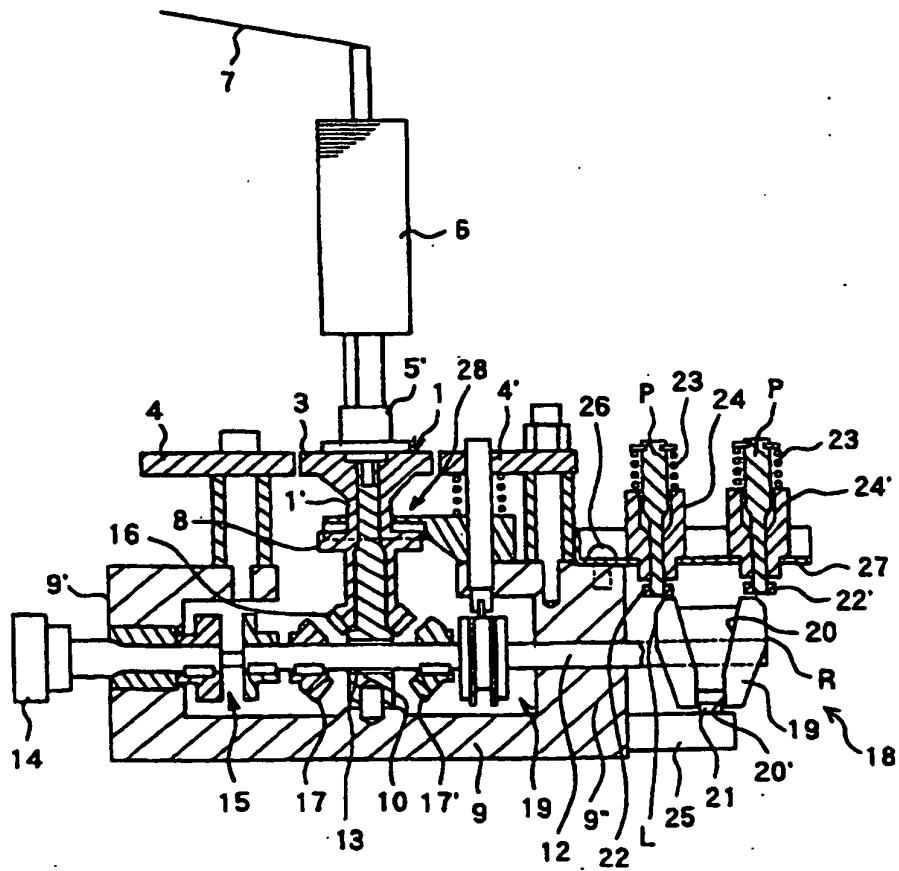


FIG. 3

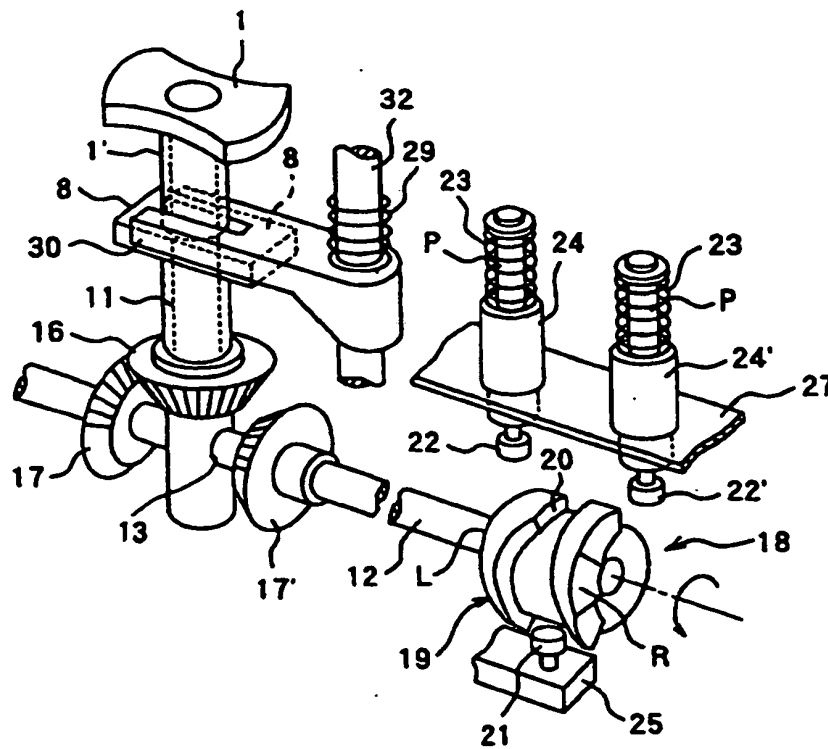


FIG. 4

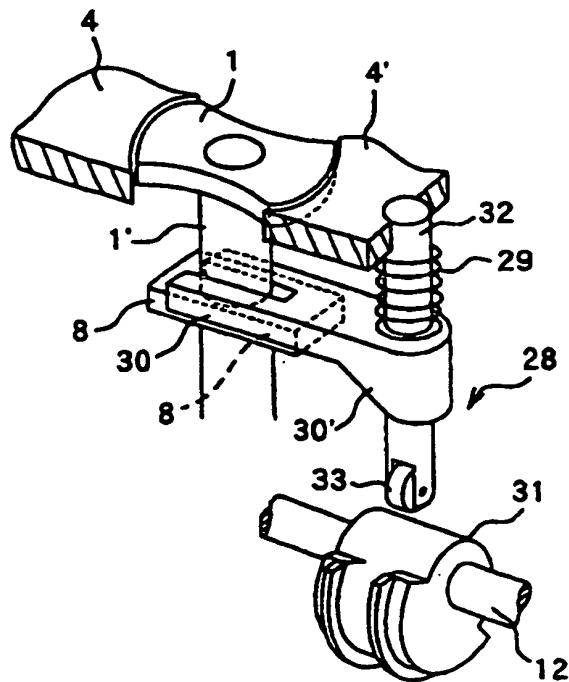
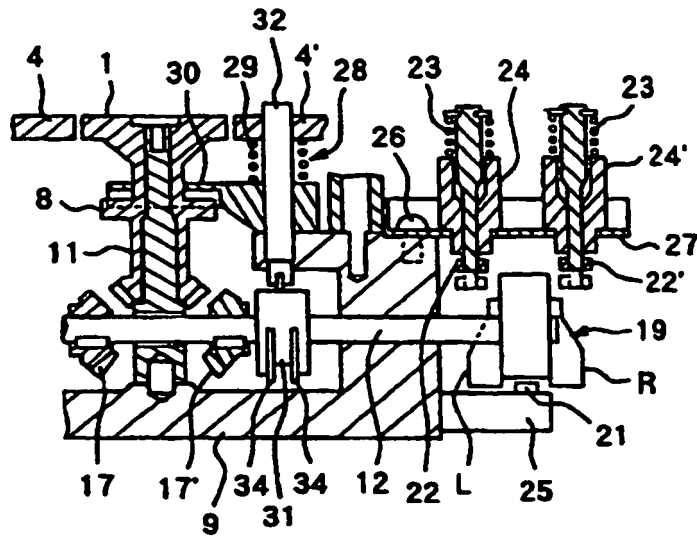


FIG. 5

(a)



(b)

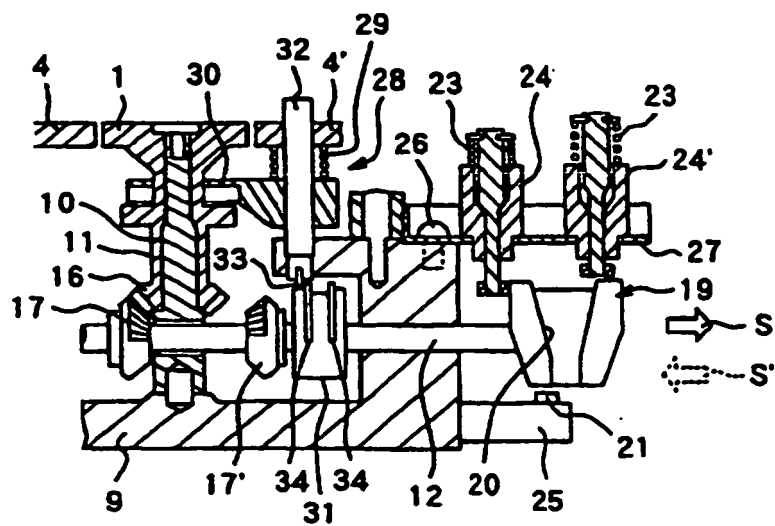


FIG. 6

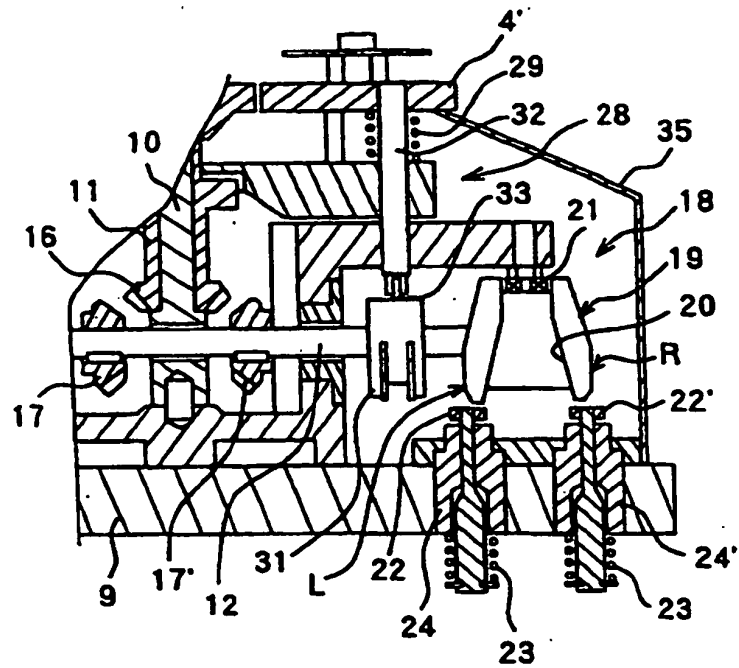
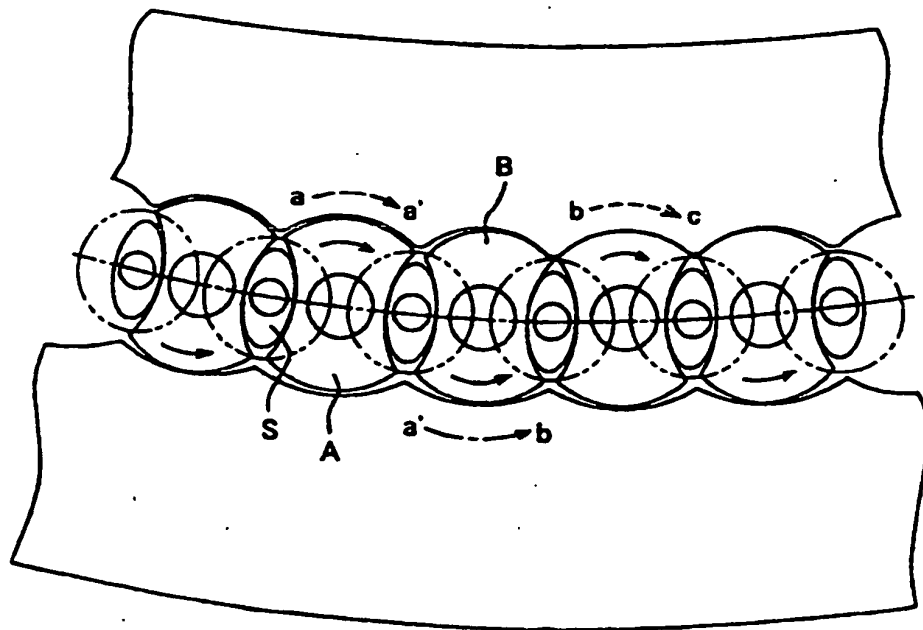


FIG. 7



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- GB 178390 A [0002]